How S-S' Di Quark Pairs Signify an Einstein Constant Dominated Cosmology and Facilitate Reconstruction of Initial Dark Matter Contributions to CMB

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Abstract. We review the results of a model of how nucleation of a new universe occurs, assuming a di quark identification for soliton-anti soliton constituent parts of a scalar field. The initial potential system employed is semi classical in nature, becoming non-classical at the end of chaotic inflation at the same time cosmological expansion is dominated by the Einstein cosmological constant. The material below is now a proposal, in part accepted as a point of discussion as a white paper (appropriately) submitted to the Dark Energy Task Force, in its mission to advise (through its parent committees) the NSF, NASA and DOE. This was for helping to select both ground-based and space-based techniques for analyzing data as well as recommending the science requirements for a space-based dark energy mission.

Keywords: Di quarks,chaotic inflation, Einstein cosmological constant, CMB, extra dimensions
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INTRODUCTION

In June 2005, an effort was made to combine reconstruction of data gathering techniques with the requirement of the JDEM dark matter-dark energy search for the origins of dark matter in the early universe. This has, among other things, lead to methodologies being presented which could shed light as to the initial formation of scalar potentials which could contribute to CMB background radiation. In doing so, it was noted that initial dimensions, as postulated by Quin, Pen, and Silk presented evidence as to how three extra dimensions play a role in explaining how at very short distances gravity would have a r^{-5} spatial behavior dependence in force calculations. The new variant of force law would play a role in early universe nucleation models. The initial additional dimensions, n, were specified as leading to a force for small distance scales below a crucial radius of R leading to force with a spatial variance of r^{-2-n}, which we believe plays a crucial role in early universe nucleation models. Arguments they presented so happened to fix this the value of n as 3, which is enough to specify for very small dimensional settings a highly repulsive initial starting point for cosmological inflation, especially if the value of $R >> l_P$, with the initial radius of a nucleating universe being of the order of magnitude of l_P at or before a Planck time t_P.

The initial impetus for making this effort was due to the following conundrum. As is commonly known in cosmology circles, one would expect a flat Friedman-Walker universe after 60 e-foldings, but beforehand one could expect sharp deviations as to flat space geometry. The moment one would expect to have deviations from the flat space geometry would closely coincide with Rocky Kolb's model for when degrees of freedom would decrease from over 100 degrees of freedom to roughly ten or less during an abrupt QCD phase transition. As was mentioned by Joe Lykken, the CMB model should yield a distinct 'signal' which is lending toward a non flat cosmological metric space potential which can be seen to be initiating a phase transition at about the end of the 60 e-folding regime of cosmological expansion. **UNIQUE** potential structure.

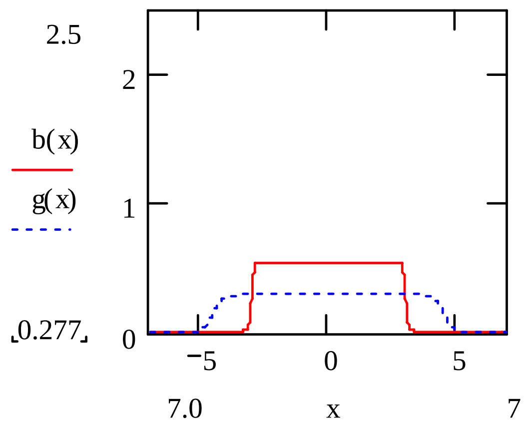

FIGURE 1. As the walls of the S-S' pair approach the thin wall approximation, a normalized distance, $L = 9$ – $L = 6$ – $L = 3$, approaches delta function behavior at the boundaries of the new nucleating phase. As L increases, the delta function behavior subsides dramatically. Here, the $L = 9 \Leftrightarrow$ conditions approaching a cosmological constant. $L = 6 \Leftrightarrow$ conditions reflecting Scherrer's dark energy-dark matter mix. $L = 3 \Leftrightarrow$ approaching unphysical delta function contributions due to a pure thin wall model.

CONCLUSIONS

Veneziano's model gives us a neat prescription of the existence of a Planck's length dimensionality for the initial starting point for the universe via:

$$l_P^2 / \lambda_S^2 \approx \alpha_{GAUGE} \approx e^{\phi} \tag{1}$$

where λ_S is a so called quanta of length, and $l_P \equiv c \cdot t_P \sim 10^{-33} cm$. As Veneziano implies by his Fig. 2, a so called scalar dilaton field with these constraints would have behavior seen by the right hand side of his Fig. 1, with the $V(\phi) \to \varepsilon^{+}$ but would have no guaranteed false minimum ϕ – $\phi_F < \phi_T$ and no $V(\phi_T) < V(\phi_F)$.

We find that the above formulation in this paper is most easily accompanied by the given S-S' di quark pair basis for the scalar field, and that it also is consistent with the initial scalar cosmological state evolving toward the dynamics of the cosmological constant via the k essence argument. This gives substance to the effort made in the DETF presentation accepted by R. Kolb, et al as of June 28, 2005.

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